Title Approaches to prediction of storage out-turn for units of fresh produce

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Abstract

The field of postharvest horticulture has traditionally focused on establishing the 'optimal' combination of harvest timing, postharvest treatments and storage technologies that result (on average) in the greatest longevity of fresh products. While much has been achieved in reducing crop losses and facilitating global trade of fresh produce, product losses in the postharvest environment that impact on industry profitability still occur, including in 'developed' industries. Many of these losses in established industries are a result of the inherent variability that is observed between batches of the same product. This variability may depend on subtle factors such as differing pre-harvest conditions for each batch, or even the position on the plant or harvest maturity of individual products. An improved ability to predict storage out-turn would allow improved 'inventory management' so particular batches of product could be targeted to the most appropriate market and maximize industry profitability. Irrespective of whether the mode of product failure is decay, chilling injury or development of advanced senescence, the ability to understand the physiology underlying batch variability and predict the behavior of each batch would be a powerful tool in stock management. Classic inventory management practices such as 'first in, first out' or 'last in, first out' may be supplanted by 'first to expire, first out' if we can increase our confidence in predicting the order in which batches will expire. A number of different postharvest approaches including metabolomics, non-destructive testing and accelerated libraries, combined with mathematical modeling, have the potential to contribute to improved prediction of storage out-turn. This paper provides examples of each of these approaches and suggests the potential for synergies in ideology and data handling methodologies that may apply across all horticultural industries.